The Olentangy River Wetland Research Park: Progress in 2000

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Introduction

This report represents the ninth annual report submitted to the University on research at the Olentangy River Wetland Research Park (ORWRP). It also represents a summary of the seventh year of actual hydrologic operation of the two experimental wetland "kidneys" on the site, and the fourth year of progress on our 7-acre mitigation wetland "billabong." Among the several other significant improvements in site infrastructure in 2000 were the following:

• Installation of macro-scale meoscosms for wetland liner studies using coal combustion by-products.

• Initiation of restoration of the bottomland hardwood forest by the Ohio Department of Transportation in cooperation with the ORWRP.

• Selection of wetland research building architect and considerable progress on design of the building.

Why a Wetland Research Park?

Wetlands are shallow to intermittently flooded ecosystems that are more commonly known by such terms as swamps, bogs, marshes, and sedge meadows. They are revered as important parts of the natural landscape because of their functions in cleaning and retaining water naturally and in providing a habitat and food source for a wide variety of plant and animal species. It is estimated that more than half of the original wetlands in the lower 48 states have been lost to drainage projects and human development projects. Ohio has lost about 90 percent of its original wetlands.

When we lose wetlands, we lose their ability to provide clean water, prevent floods and enhance biological diversity. Many organizations are calling for construction of new wetlands to clean up our streams, rivers, and lakes. The National Academy of Sciences has called for the restoration and creation of 10 million acres of wetlands in the United States by the year 2010. Five million acres of wetlands have been suggested as being necessary to help prevent the "dead zone" or hypoxia in the Gulf of Mexico from the Mississippi River basin. The National Academy of Sciences also found that so-called mitigation wetlands, those wetland that are constructed to replace wetlands destroyed for development, leave a lot to be desired.

In order to solve such problems we need to know: 1) how wetlands work; 2) if we can create and restore them; and 3) the best approaches to creation and restoration of wetlands. The Olentangy River Wetland Research Park is designed to be a long-term, large-scale wetland research facility on a major college campus.

Progress at OSU's Wetland Site

The Olentangy River Wetland Research Park is located on a 30-acre site owned by the Ohio State University, immediately north of Dodridge Road and adjacent to the Columbus campus (Figures 1 and 2). The site has been developed in three phases:

Phase 1 — Construction of two experimental wetland basins and their water delivery system;

Phase 2—Development of a research and teaching infrastructure at the site including boardwalks, experimental mesocosms, a plant-material greenhouse, additional wetlands, instrumentation for long-term research, and a visitor pavilion; and

Phase 3—Development and construction of a wetland research/education building on the site.

Phase 1 of site development, which featured construction of two 2.5-acre deepwater marshes and a river water delivery system, was completed in 1994. Pumps were installed on the floodplain to bring water from the Olentangy River to the wetlands and pumping officially began on March 4, 1994. River water is pumped continuously, day and night, into the two wetlands. It then flows by gravity back to the Olentangy River through a swale and constructed stream system. In May 1994, one wetland basin was planted with marsh vegetation typical of wetlands in the Midwest; the other remained as an unplanted control. This has become the major full-scale "experiment" at the site.

Phase 2, establishing the infrastructure for research and education of the site, began in 1994 and was completed in 1999 with the dedication of the Sandefur Wetland Pavilion. This phase included building the 7-acre billabong.

Phase 3, the construction of the Wetland Research and Education Building at the ORWRP, began in earnest with the receipt of a $1 million grant from the Ohio Board of Regents in mid-1999. Planning that included a Memorandum of Understanding among University Officials and a Program of Requirements (PoR) that outlines the functions of the various rooms in the new building were developed in 1999. In 2000 the architect was chosen and starting in July 2000, building design began in earnest. Significant progress on building design occurred in 2000.

Figure 1. Aerial photograph of Olentangy River Wetland Research Park, just north of the Ohio State campus, from October 2000. Several initiatives started or completed in 2000 are indicated.

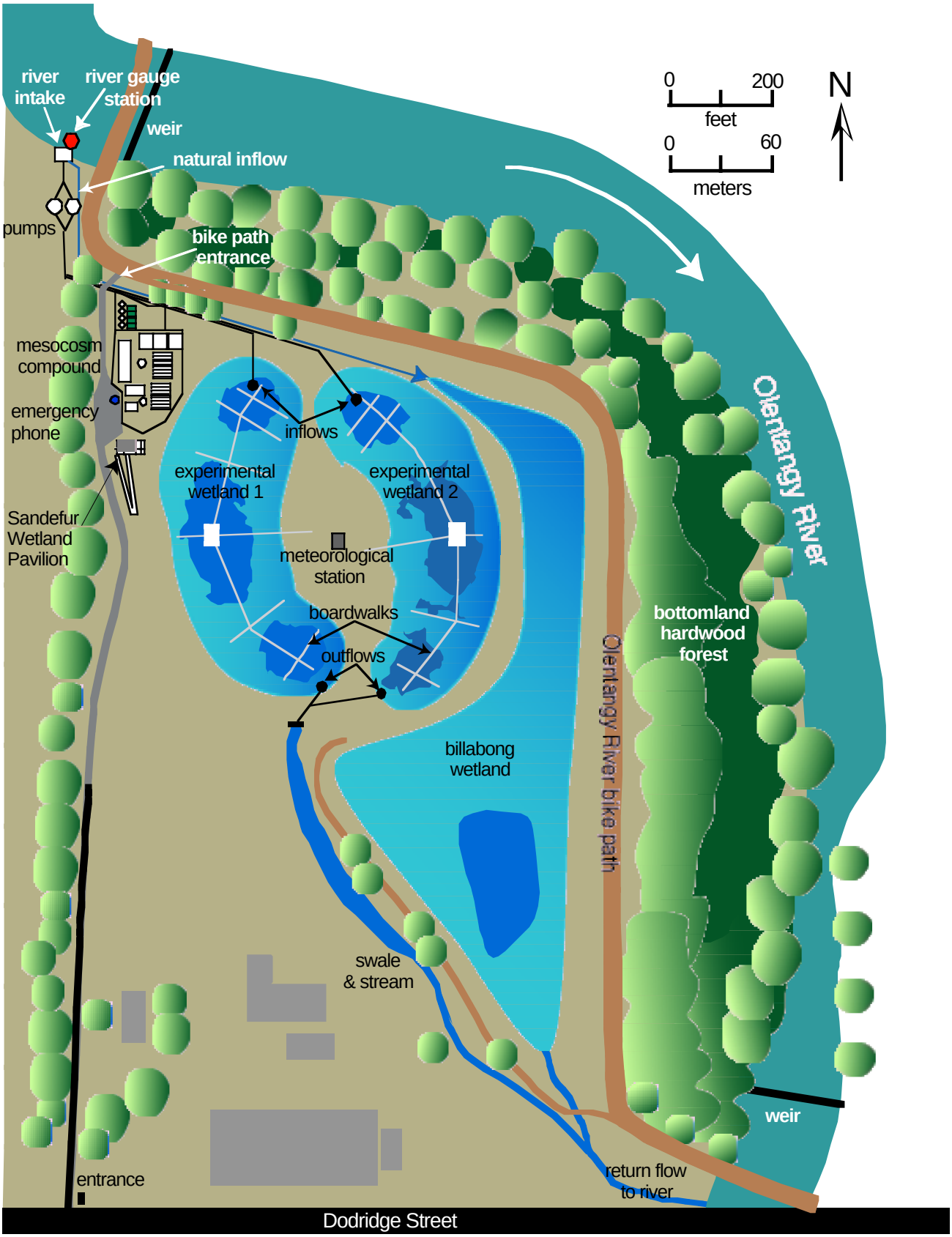

Figure 2. Progress at the Olentangy River Wetland Research Park through December 2000.

FGD-liner mesocosms

Four experimental mesocosms for investigating coal waste products as liners for wetlands were constructed in the mesocosm compound (Figure 3). An Ohio EPA permit was obtained on May 3, 2000 for construction of these flow-through systems. Basin construction began in mid-2000 and plants were introduced to the wetlands in late fall. The wetland basins were designed through a subcontract with Zande & Associates, Inc.

Bottomland restoration

The bottomland forest restoration, a cooperative project with Ohio Department of Transportation (ODOT) began with ODOT personnel cutting 4 notches in the bottomland artificial levee in June 2000 (Figure 4) with heavy machinery. These notches will allow the river to once again flood the bottomland forest.

Walking path

A walking path was started along the southwestern shore of the billabong. Eventually this walking path will encircle the wetlands. Material was provided by Davey Resources.

Starting the wetland building design

Design meetings began in July 2000 with NBBJ, the company chosen by University Architects to design the wetland building.

Teaching, Research, and Service

Teaching

Integrating wetland research with University teaching has been an emphasis at the Olentangy River Wetland Research Park since its inception. From the time that a Natural Resources graduate seminar class in 1991 helped to design the project, dozens of formal courses involving thousands of students have made use of the site for ecological or other projects related to wetlands or the river. These formal courses include classes on wetlands, water quality, ecological engineering, anthropology, architecture, environmental impact analysis, animal ecology, ornithology, and forestry. Sixteen OSU classes involving several hundred students formally used the site in 2000 (Table 1). he site is also used for dozens of hours of undergraduate and graduate research credit. The site was also used by Columbus State, Wright State, and Kenyon College for several courses in 2000.

Table 1. Formal class use of Olentangy River Wetland Research Park, 2000.

Term	Course	Number of Students	Instructor
Winter 2000			
	NR 760 Ecosystem Modeling	17	Mitsch
	NR 601 Issues in Crop and Turf Science	16	Scheerens
	Biology 111 Wetland Values and Functions - Columbus State	20	Michael Bailey
	EEOB Mammalogy	70	Harder
	JCOM 202 Advanced Reporting and Newswriting	50	
Spring 2000			
	LARCH 323 Landscape Architecture	23	Brooks Breeden
	LARCH 622 Landscape Architecture	23	Brooks Breeden
	EEOB 322 Introduction to Ornithology	20	
	EEOB 413 Introduction to Ecology	20	
	Science Journalism	18	Sharon West
	Biology 111 Introduction to Biology – Columbus State	15	Mike Bailey
	NR 355 Water Quality Management	50	Julie Cronk
Summer 2000			
	Ecology Class Wright State	7	Jim Amon
	OSU ENG 2-1364 Adv. Eng. For Academic Purposes	14	Julie Taaffee
	175 Introduction to Biology Columbus State	11	Mort Javadi
Autumn 2000			
	NR 725 Wetland Ecology and Management	25	Mitsch
	NR 355 Water Quality Management	35	Bouchard
	CE 964 Sampling and Instrumentation	3	Granata
	CE 610 Analysis of Natural and Polluted Waters	30	Walker
	Freshwater Ecology Kenyon College class	8	Fennessy
	EEOB Field Ecology	50	

Figure 3. Construction of FGD liner experimental mesocoms in the mesocosm compound in 2000. This project is funded by the Ohio Coal Development Office and is investigating useof power plant waste products as liners for wetlands.

Figure 4. a) Construction of the levee notches in the bottomland hardwood forest levee by Ohio Department of Transportation; b) view of Notch #1 at the north end of the ORWRP site after construction.

Table 2. Theses and dissertations completed at the Olentangy River Wetland Research Park through 2000.

The Ohio State University

Undergraduate honor's theses

- **Katherine E. Kleber** "Fish population and movement within planted and naturally colonizing experimental wetlands, autumn 2000" (2000)
- **Erika A. Filippi** "The role of soil organic matter on denitrification potential in newly created wetlands" Natural Resources (1998)
- **Bonnie F. Elfritz** "A comparison of natural wetlands with a constructed wetland using the Floristic Quality Assessment Index" Natural Resources (1998)
- **Kimberly K. Schamp** "Groundwater patterns before and after wetland construction at the Olentangy River Wetland Research Park" Natural Resources (1997)
- **Nicole L. Vorwerk** "Comparison of three years of pH values between planted and unplanted wetlands at the Olentangy River Wetland Research Park" Natural Resources (1997)
- **Rainie D. Gardner** "Fish recruitment in the Olentangy River constructed wetlands" Natural Resources (1997)
- **Tonya Cheek** "Effect of fish on wetland water quality" Natural Resources (1996)
- **Andrew W. Wehr** "Early water quality of created wetlands at the Olentangy River Wetland Research Park" Natural Resources (1995)
- **Michael E. Berkal** "Hydrology and water chemistry of the Olentangy River in Worthington (Franklin County), Ohio, and their potential effects on a future constructed wetlands facility downstream in Columbus, Ohio" Natural Resources (1992)
- **Douglas G. Stuart** "Intensive water quality sampling in two constructed riparian wetlands" Natural Resources (1992)

Ph.D. dissertations

- **Michael A. Liptak** "Water column productivity, calcite precipitation, and phosphorus dynamics in freshwater marshes" Environmental Science Graduate Program (2000)
- **John J. Gutrich** "Ecological and economic analysis of natural capital: Assessing and modeling the substitutability of mitigation wetlands for natural sites" Environmental Science Graduate Program (2000)
- **Douglas J. Spieles** "Nutrient retention and macroinvertebrate community structure in constructed wetlands receiving wastewater and river water" Environmental Science Graduate Program (1998)
- **Randall J.F. Bruins** "Modeling of flooding response and ecological engineering in an agricultural wetland region of Central China" Environmental Science Graduate Program (1997)
- **Neal E. Flanagan** "Comparing ecosystem structure and function of constructed and naturally occurring wetlands: Empirical field indicators and theoretical indices" Environmental Science Graduate Program (1997)
- **Robert W. Nairn** "Biogeochemistry of newly created riparian wetlands: evaluation of water quality changes and soil development" Environmental Science Graduate Program (1996)
- **Naiming Wang** "Modelling phosphorus retention in freshwater wetlands" Environmental Science Program (1996)
- **Paul E. Weihe**,"Colonizing and introduced vegetation in created riparian wetlands: Establishment during the first two growing seasons" Environmental Science Graduate Program (1996)

Master's theses

- **Sarah K. Harter** "Patterns of short-term sedimentation in a freshwater created marsh" Natural Resources (1999)
- **Sharon A. Johnson** "Effects of hydrology and plant introduction on first-year macrophyte growth in a newly created wetland" Natural Resources (1998)
- **Lisa J. Svengsouk** "First-year response of *Typha latifolia* L. and *Schoenoplectus tabernaemontani* (K.C. Gmel.) Palla to nitrogen and phosphorus additions in experimental mesocosms" Environmental Science Graduate Program (1998)
- **Kathleen D. Metzger** "Self-design of a fish community in a created riparian freshwater marsh: A simulation model" Environmental Science Graduate Program (1997)
- **John S. Koreny** "Hydrology of a constructed riparian wetland system: Characterization and predictive modeling" Environmental Science Graduate Program (1996)
- **Uygar Özesmi** "A spatial habitat model for the marsh-breeding red-wing blackbird (*Agelaius phoeniceus*) in coastal Lake Erie wetlands" Environmental Science Graduate Program (1996)
- **Doreen M. Dudek** "Tree growth responses to streamflow in a bottomland forest in central Ohio" Natural Resources (1995)
- **Steven F. Niswander** "Functional analysis of a created in-stream mitigation wetland: hydrology, phosphorus retention, and tree growth" Natural Resources (1994)
- **Renée F. Wilson** "Progress and success of five mitigation wetlands in Ohio" Natural Resources (1995)
- **Karen M. Wise** "Evaluation of acid mine drainage control by a constructed wetland in southeastern Ohio" Natural Resources (1994)
- **Frank D. Voss** "Groundwater investigation of Ohio State University wetland site" Geodetic Science (1993)

Theses at Other Universities

- **Hojeong Kang** "The significance of enzyme activities in wetland biogeochemistry" University of Wales, UK (1999)
- **Pernille Mortensen** and **Pernille Lanzky** "Water quality improvement in a constructed wetland" Thesis, Royal Danish School of Pharmacy, Copenhagen, DENMARK (1996)
- **Rebecca Smith** "Nitrogen transfer in groundwater in the riparian zone of the Olentangy River, Columbus, Ohio" Thesis, Cambridge University, Cambridge, England, UK (1996)

Table 3. Extramural funding to Ohio State University Research Foundation at the Olentangy River Wetland Research Park active in 2000.

RF #	Short title	Funding Source	College	Amount	end date
735542	Watershed wetland demonstration	Indian Lake Demo Project	FAES	$18,225	2/28/01
731631	Constructed wastewater wetland	SW Licking Co W&S District	FAES	$175,028	6/30/00
738587	Restoration of a bottomland forest	Ohio Dept Transportation	FAES	$75,000	5/1/06
733487	A mitigation wetland	Pine Grove, Inc.	FAES	$54,242	12/31/01
736809	Molecular biodegradation in wetlands	USDA	MAPS	$90,000	9/30/01
737009	Pesticide phototransformation in wetlands	NOAA	BIOL SCI	$150,000	7/31/00
738869	Reuse of clean coal FGD material, part 2	Ohio Dept of Development	ENG/FAES	$470,000	1/31/03
	Center for Wetland and River Restoration	Ohio Board of Regents	FAES	$1,180,000	6/30/02
739447	Pre-restoration studies of Upper Big Darby	The Nature Conservancy	FAES	$5,952	9/30/00
	TOTAL			$2,218,547	

Research

Since the wetland project first began in 1992 and especially since the two 1-ha basins were flooded on March 4, 1994, dozens of research projects have been initiated on the project by graduate and undergraduate students and post-docs from Ohio State University and elsewhere. Results of those research projects are presented annually in these annual reports. A total of 32 students have completed dissertations, master's theses, or honor's undergraduate theses with partial or full use of the Olentangy River Wetland Research Park from 1992 through 2000 (Table 2). While most student are from Ohio State, there have been 5 students from Europe (two from UK, three from Denmark) who collected thesis data at the ORWRP including Dane Rikki Broennum in 2000. Dozens of organizations in addition to Ohio State have collected data or conducted research at the ORWRP.

As a result of having the ORWRP, $2.2 million in research funding to The Ohio State University Research Foundation (OSURF) and the Office of Research were active in 2000 (Table 3).

Service

The ORWRP had many activities in 2000 (Figure 5). These activities include the Moonlight on the Marsh seminar seminar by S.E. Jørgensen in July 2000, tours of the wetlands (Figure 6), and passive use of the wetland pavilion by passers-by. Interest by the public continues to grow. We had 90 tours or public presentations on the Olentangy River Wetland Research Park in 2000 to over 1100 individuals (Table 4). The number of tours given continues to rise annually (Figure 7). Some of those taking the tour were well-known scientists and engineers including: Dr. Hongmo Yang, Chonnam National University, China; Jim Gosselink, Professor Emeritus, Louisiana State University; Len Shabman, Virginia Tech; Jim Bay, CH2M-Hill, Tampa FL; Harald Rosenthal, University of Kiel, Germany; David H. Barker, Geostructures Consulting, Leeds, UK.

Publicity

The Olentangy River Wetland Research Park was publicized 19 times in 2000 in several newspaper articles (Table 5). Copies of all the articles published on the site in 2000 are given in the Appendix of this annual report.

The Plan

The Master Plan

Substantial progress has been made on this project for the past 8 years. Phase 2 was completed in 1999 and Phase 3, the last phase of site development shown in the site master plan (Figure 8) calls for construction of a wetland research/education building. Substantial progress was made on planning this building project in 2000.

Development and Other Capital Support Through 2000

The infrastructure of Olentangy River Wetland Research Park has been supported almost entirely in its first decade (1991-2000) through private donations to the University. Through December 2000, the equivalent of over $1,100,000 has been raised for the wetland project (Table 6), mostly from corporations and individuals. In 2000, there were 247 identifiable donations for a total of $156,077. About one-third of the donation amount that we have received since 1992 has been as in-kind contributions such as the billabong, boardwalk material, and a Jeep Tracker. A used Jeep Cheokee vehicle worth $11,300 was an in-kind gift received in 2000. In 2000, approximately $85,000 was received for the Research and Education Building.

A Research and Education Building

The wetland research and education building will be built on the site in 2002 to take full advantage of the campus wetlands and to relieve overcrowding of labs, offices, and research facilities on campus. The building will house a

Figure 5. Miscellaneous photos of activity at the Olentanty River wetlands in 2000: a) and b) Moonlight on the Marsh seminar by S.E. Jørgensen, Copenhagen University, Denmark, July 7, 2000; c) orithology class at ORWRP; d) family using the Sandefur Wetland Pavilion spotting scope; e) College of Engineering class for women engineers using ORWRP; f) sampling biomass in August 2000.

a)

b)

Figure 6. a) Dr. Mitsch leading a tour of the wetlands; b) ORW wetlanders in 2000, many of whom help give tours of the wetlands.

Table 4. Tours and non-scientific presentations of the Olentangy River Wetland Research Park, 2000.

Date		Organization	Est. Number
1/21/00	*	Tina Pippin, prospective grad student	1
1/21/00	*	Kim Hornung, prospective assistant	1
2/1/00	**	Dr. Hongmo Yang - Chonnam National University	1
2/1/00		Friends of Lower Olentangy Watershed (FLOW) Presentation	30
2/9/00	*	David Greene, Mid-Ohio Regional Planning Committee	1
2/14/00		Dr. Karl Korfmacher Denison University presentation	25
2/15/00	*	Cayahoga County 4H group, Greg Siek leader	10
2/23/00	*	Kashmira Asnani - perspective graduate student	1
3/6/00	*	Carrie Nasrallah - perspective graduate student	1
3/6/00	*	Na-Yun - OSU student	1
3/16/00	**	David Austin, Living Technology, Inc.	1
3/21/00	*	Sharon Reed - perspective graduate student	1
3/21/00	*	Ken Simeral - OSU Extension/Leadership program	15
3/22/00	**	Jim Gosselink, Professor Emeritus, Louisiana State University	1
4/13/00	*	The Columbus Operations Advisory Committee	7
4/13/00	**	Len Shabman, Virginia Tech	1
4/13/00	*	Serena Selbo - Ph.D. Student EEOB Research	1
4/13/00	*	Cinti Museum of Nat. Hist.& Sc. Edge of Appalachia Preserve, Chris Bedel & colleague	2
4/14/00	*	OSU - Yo Chin & colleague	2
4/19/00	*	Regional Campus Advisors	22
4/19/00		Biology Department, University of Notre Dame	40
4/20/00	*	Earth Day Clean-up	50
4/22/00	*	Channel 10	2
4/25/00	*	ORWRP advisory committee	5
4/26/00		YSI, Yellow Springs, OH	30
5/1/00	**	Jim Bay, CH2M-Hill, Tampa FL	4
5/4/00	*	Wyndot Run Elementary 3-4th graders	60
5/4/00	*	Jay Martin, LSU	2
5/4/00	*	New Albany High School German Exchange Program	15
5/5/00	*	OSU - Focus Group Weekend (potential donors)	24
5/11/00	*	New Albany School – 2 summer interns	2
5/12/00	**	Derek Lovley, U of Mass, Distinguished Scientist	1
5/15/00	*	Horizon Science Academy	15
5/17/00		First Ballona Wetland Symposium, Los Angeles, CA	40
5/18/00	*	Mike Bailey, Columbus State class	20
5/23/00	*	Zande & Associates	5
5/31/00	*	Mort Javadi and class, Columbus State	15
6/6/00	*	Theresa Silo	1
6/15/00	*	Steve Fondriest, Malcoomb Lynch, Ott Instruments	2
6/17/00	*	WBNS TV	2
6/17/00	*	RH Mitsch and nuns from MN	4
6/20/00	*	Agriculture & Science Youth Camp	10
6/22/00	*	Mobile Urban Day (MUD) Camp	20
6/23/00	*	Worthington Senior Citizen's Center	24
6/26/00	*	ORWRP Short course - Wetland Delineation	25
6/28/00	*	Army Corps of Engineers with TNC project	1
6/29/00	*	Mobile Urban Day (MUD) Camp	20
7/5/00	*	Moonlight on the Marsh lecture series	75
7/7/00	*	Enrichment Program tour w/ Rose Sartor	3
7/7/00	**	Jim Patterson & Chagrin Land Conservancy	5
7/7/00	*	Marshal Eames & daughter	2
7/10/00	*	Jim Amon and Wright State University class	12
7/13/00	*	Mobile Urban Day (MUD) Camp	15
7/15/00	*	Metaphysical Bookstores – Psyche Torok	20
7/20/00	*	Mobile Urban Day (MUD) Camp	15
7/21/00	*	Julie Taffer, Adv. Eng. for academic purposes	14
7/24/00	*	Session 1 - College of Engineering Women in Engineering Program – Linda Weavers	25
7/24/00	*	Session 1 - College of Engineering Women in Engineering Program – Ann Christy	25
7/27/00	*	Mobile Urban Day (MUD) Camp	20

Table 4, continued

7/28/00	*	Potential OSU Students from Logan High School	8
8/1/00	*	YSI Endowment Committee	7
8/1/00	*	Chadwick Arboretum w/ Mary Maloney	15
8/2/00	*	NBBJ and architects	8
8/14/00	*	Ohio Association of Agricultural Educators	20
8/14/00	*	ORWRP short course - Wetland Creation and Restoration	17
8/17/00	*	Mobile Urban Day (MUD) Camp	15
8/18/00	*	ACE Dominican College Day Camp	15
8/18/00	*	ORWRP advisory committee	4
8/24/00	*	Mobile Urban Day (MUD) Camp	15
9/6/00	**	Ohio EPA Vera Coutant	2
9/11/00	**	David H. Barker & P.T. Woo	2
9/20/00	*	Upper Arlington 3rd Graders	30
9/21/00	*	Upper Arlington 3rd Graders	26
9/28/00	*	Brownie Troop, Julie Conry leader	9
9/29/00	*	Walt Minnich (Development Potential Donor)	1
9/30/00	*	Columbus Zoo Association	40
10/2/00	*	Bill Resch, New Albany High School Tour	31
10/3/00	**	Charles Williams, SNR Forest Restoration candidate	3
10/14/00	*	EEOB 657, Field Ecology	14
10/20/00	**	Kevin Fitzsimmons, U. of Arizona	2
10/20/00	*	ESGP Prospective Students	2
10/24/00	*	Perry Wolfe, Diamond Electric	2
10/28/00	*	Cub Scout Troop (included site clean-up)	20
11/3/00	**	Hugo Nava- Peru	2
11/3/00	*	Kenyon College class - Siobhan Fennesssy	20
11/6/00	**	Ikuko Deguchi- Chuogakuin University, Japan	1
12/1/00	**	Harald Rosenthal, University of Kiel, Germany	2
12/15/00	*	Jeff Bell-Business First	1
12/18/00	*	Janet Adams - Business First	1
12/27/00	**	Sara Suggs - Shorelands & Environmental Assistance Program	2
TOTAL			1132
# of Tours/Presentations			90

*site tour**site tour with visiting scientist or distinguished visitor

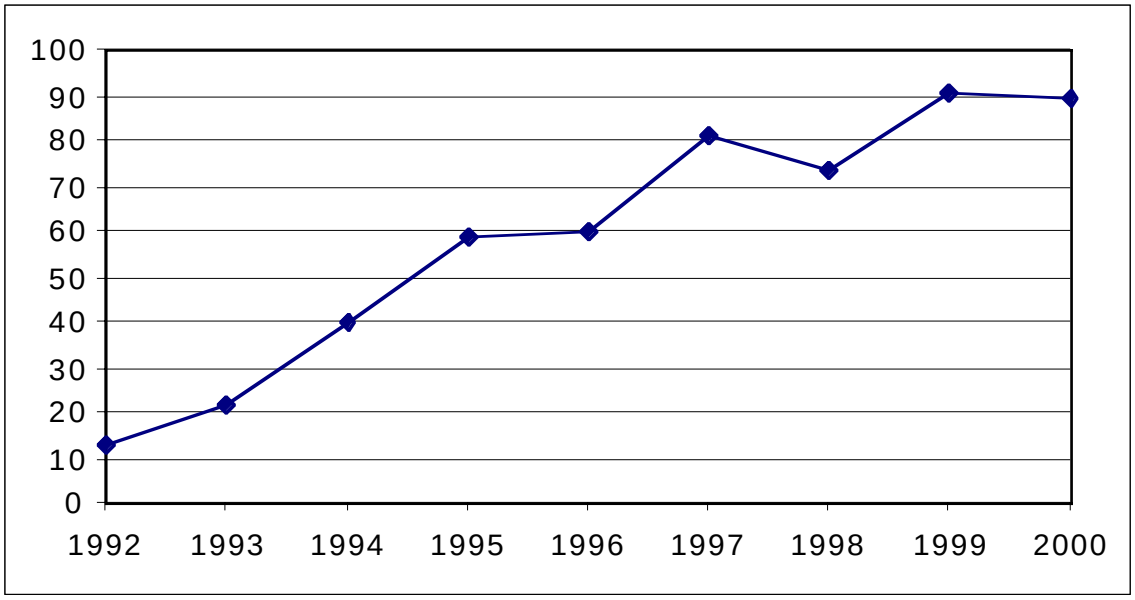

Figure 7. Number of tours and public presentations on the ORWRP from 1992 through 2000.

Table 5. Press and media coverage of the Olentangy River Wetland Research Park, 2000.

Date	Article Title or Event	Publication
January 2000	"Wetlands Visitor pavilion dedicated"	enVision
Jan 10, 2000	"Wetland Wonderland"	The Lantern
Feb 19, 2000	" Do mitigated wetlands really work?"	AAAS Press Release
April 6, 2000	" Explore a wetland on Earth Day"	OARDC Environment
April 20, 2000	"On Earth Day and every day, OSU research is global"	onCampus
April 21, 2000	" Campus park cleaned for Earth Day"	The Lantern
May 14, 2000	" Wetlands known for their water cleansing benefits"	Wheeling News Register Sunday
May 20, 2000	"Mitigated wetland success qestioned"	RESOURCE (ASAE)
May 28, 2000	" Company donates $2000 for wetland research"	The Columbus Dispatch
June 11, 2000	"Communities compete for science center"	Ploughkeepsie Journal
June 11, 2000	"States work to fix past ecological blunders"	Ploughkeepsie Journal
June 16, 2000	"Wetlands to become classroom"	The Columbus Dispatch
June 19, 2000	"Levee work betters park"	The Lantern
June 22, 2000	"River surgery"	onCampus
July/August 2000	"Unique approach reaps award for professor's environmental effort"	enVision
August 24, 2000	"Notables - Wetland recognition"	onCampus
Nov 16, 2000	"Wetland park enters high-tech era with new research facility"	OSU NEWS
Nov 20, 2000	"$2.8 million expansion of wetland research park to include state-of--the-art technology"	Central Ohio Source
Dec 7, 2000	"Wetland park enters high-tech era with new research facility"	onCampus

Table 6. Development support for the Olentangy River Wetland Research Park through 2000*.

Year	Number of donations	Total amount of donations	In-kind donations	Endowment donations	General cash donations	Building fund
2000	247	$156,077	$11,300	$37620	$22,129	$85,028
1999	165	$115,626	$3,705	$94,050	$17,821	$50
1998	149	$98,839	$28,624	$3,985	$66,230	
1997	168	$78,228	$13,503	$300	$64,425	
1996	146	$221,889	$200,283	$4,000	$17,605	
1995	108	$97,184	$36,516	$11,000	$49,668	
1994	86	$62,686	$48,744		$13,942	
1993	46	$259,206	$25,606		$233,600	
1992	7	$59,347	$6,327		$53,020	
TOTAL	1122	$1,149,080	$374,608	$151,385	$538,008	$85,078

* Support throuugh 1999 was used to complete Phase 1 and Phase 2 of the wetland site and to establish an endowment for the site. Beginning in 2000, significant monies have been earmarked for the new building.

state-of-the-art control room or "operations theater" where every physical, chemical, and biological change in the wetland could be monitored in real time by staff wetland scientists. It would also include a conference center for continuing education-type courses . The building will also include faculty and student offices, wet-laboratories for water analysis, a soil-water-plant analysis prep room (mud room), a computer laboratory, and a major wetland library. The cost of the research building is estimated by the University Architect's office to be $2.8 million (Table 7). By the end of 2000, $85,000 had been raised for the building.

Wetland Endowment

In addition to the capital needs described above, the natural ecosystems and site infrastructure at the ORWRP will require continual managment and upkeep. A goal of $1.3 million was established for an endowment to this campus natural area in perpetuity. By the end of 2000, over $150,000 had been raised in endowments for the site in two endowment accounts. One account is specifically to support the undergraduate site engineer who is responsible for maintainance of the ORWRP site.

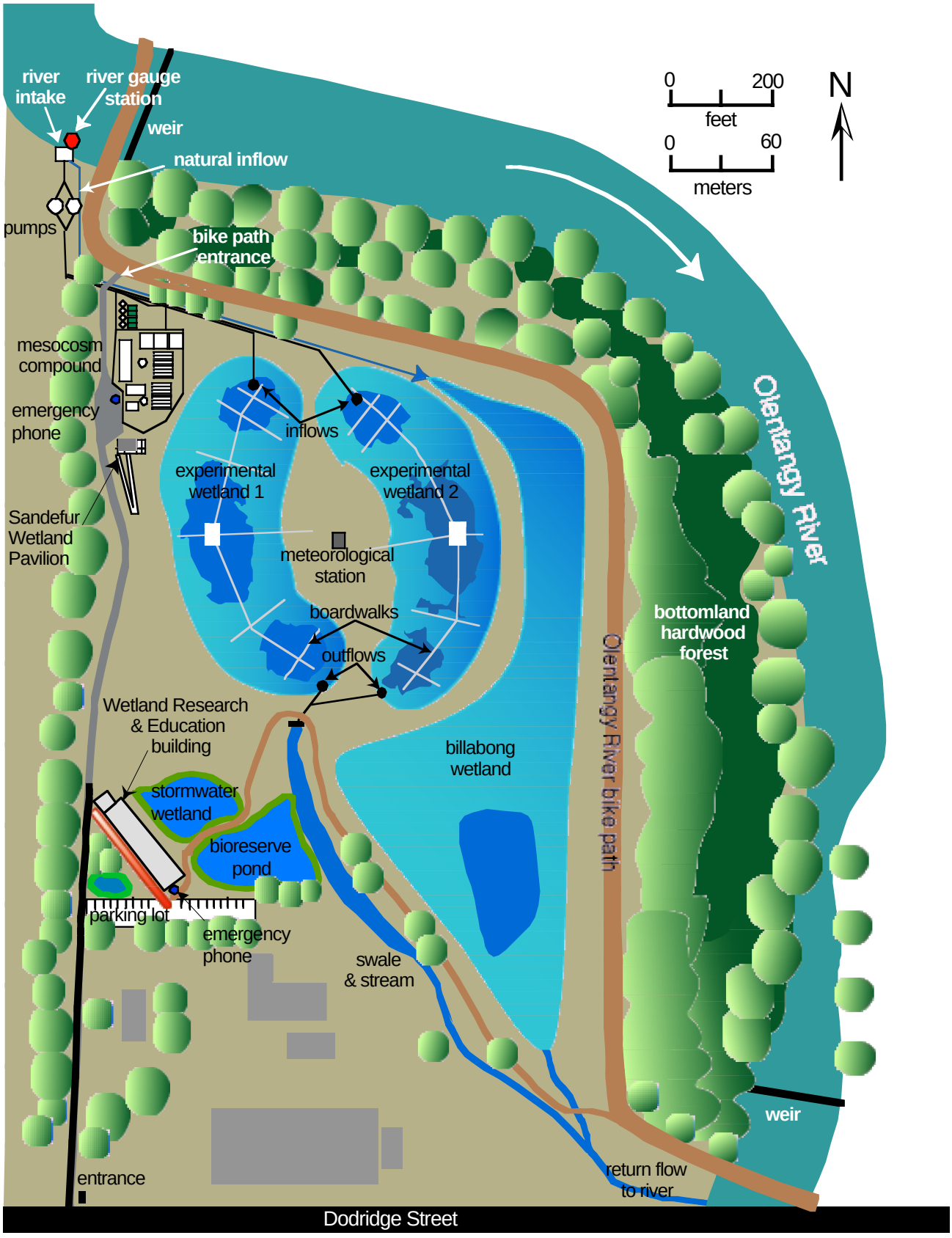

Figure 8. Master plan for the Olentangy River Wetland Research Park.

Figure 9. Architect's sketch of proposed wewtland research and education building to be constructed at Olentangy River Wetland Research Park.

Summary

The Olentangy River Wetland Research Park has successfully integrated wetland research with University teaching and service through its first nine years since serious planning began. The site has been used by thousands of students and campus visitors for formal and informal learning, and has attracted $$ millions to the campus in grants, contracts and donations.

This site is a laboratory much in the public eye and, in a limited fashion, available for the enjoyment of the public. While activity in teaching and research have increased every year, public use and interest has increased every year as well. The Sandefur Wetland Pavilion which was finished in 1999, coupled with the city's bike path which was completed in 1998, make the site much more accessible to the public.

Table 7. Cost estimate for wetland research and education building*.

Construction Costs	$1,766,151
Movable Furnishings and Equipment (FFE)	470,262
Contingency	335,462
Design Fees	156,292
Artwork 1.0%	28,000
University Administration Fee	33,546
Bidding/Advertising/Permits/Miscellaneous	20,000
Total Project Cost	**$2,809,713**

* Estimate developed by Ohio State University Architect, November 1998